Form C-104
Rev. 2/01

CONSTRUCTION VALUE ENGINEERING CONCEPT PROPOSAL
MISSOURI DEPARTMENT OF TRANSPORTATION

Date 08/19/2010

Contract ID 100514-501 **Job No.** J5P0347G

County Camden **Route** 54 **Original Bid Cost** $16,758,269.92

Contractor Emery Sapp & Sons **By** Matthew Oesch

Designed By Matthew Oesch **Phone** (573) 489-9216

VECP 10-85

1. **Description of existing requirements and proposed change(s). Advantages/Disadvantages**

   The following Value Engineering Proposal regards relocation of the Route KK bypass from its' current location on the north side of Existing Rte KK to the south side of the highway. Relocating the bypass to the south side of Existing KK will produce numerous advantages. An estimated cost savings of approximately $18,157.15 will be obtained from the VE Proposal. The VE will help expedite the project and resolve constructability issues overlooked in the original Rte KK Bypass design.

2. **Estimate of reduction in construction costs.** $19,486.14

3. **Prediction of any effects the proposed change(s) will have on other department costs, such as maintenance and operations.**

   None

4. **Anticipated date for submittal of detailed change(s) of items required by Section 104.6 of the Specifications.**

   08/19/2010
   (date)

5. **Deadline for issuing a change order to obtain maximum cost reduction, noting the effect of contract completion time or delivery schedule.**

   08/25/2010 (date) — Prevent undercutting area where ogrinial bypass is designed to lay. (effect)

6. **Dates of any previous or concurrent submission of the same proposal.**

   N/A
   (date and/or dates)

Additional Comments:

A letter with detailed explanations of the construction modifications and a spreadsheet detailing cost savings are included.

***** Portion Below This Line To Be Filled Out by MoDOT *****

Comments: I recommend approval of this Value Engineering Concept. It has been well planned by Emery Sapp and Sons and they have worked with the project office preliminarily to see if this concept would work. MoDOT will have to issue an initial change order for the V.E. based on the information provided but will have to issue a final change order for this concept once the work is complete as it has the potential to be more of a savings. This concept also helps MoDOT as it will allow the contractor to continue work in an area where the stage construction currently has utility conflicts.

Joshua D. Kincaid Asst. R.E. — Submitted By Resident Engineer — 08/20/2010 — Date

Comments: Based on the above comments and the preliminary efforts between the project office and the contractor to review this concept for feasibility, I recommend approval.

☒ **Approval Recommended**
☐ **Rejection Recommended**

District Engineer — 8/25/10 — Date

Comments:

☒ **Approval**
☐ **Rejection**

David D. Gaines — State Operations Engineer ALTK — 8-30-10 — Date

Distribution: **Resident Engineer, District Operations Engineer, State Operations Engineer**
***Value Engineering Administrator - *MoDOT, P.O. Box 270, Jefferson City, MO 65102**

Original Rte KK Bypass

Item	Description	Quantity		Cost	Total Cost
0290	6.5" Bit Pavement	2450.3	SY	$22.76	$55,768.83
0180	4" Type 1 Aggr Base	2450.3	SY	$6.15	$15,069.35
0930	4" Yellow Waterborne	2692.12	LF	$0.25	$673.03
0920	4" White Waterborne	2692.12	LF	$0.25	$673.03
0840	4" Yellow Tape	3388	LF	$1.10	$3,726.80
0830	4" White Tape	2981	LF	$1.10	$3,279.10
0960	Stripe Removal	6369	LF	$0.30	$1,910.70
0070	Unclassified Excavation	5842	CY	$3.42	$19,979.64
0080	Compacting Embankment	2343	STA	$0.25	$585.75
0090	Comp in Cut	11.22	STA	$515.00	$5,778.30
1060	36" Grp C Pipe	78	LF	$55.00	$4,290.00
1390	36" Metal FES	2	EA	$618.00	$1,236.00
0510	Type 4 RDL	12	CY	$8.00	$96.00
	Total for Original Rte KK Bypass				**$113,066.52**

Stage 1

	Linear Grading Class 2	3.5		$750.00	$2,625.00
0180	4" Type 1 Aggr Base	416.08	SY	$6.15	$2,558.89
0220	Bit Base PG64-22	107.4	TN	$85.00	$9,129.00
0540	Impact Atten (9 barrel)	1	EA	$3,500.00	$3,500.00
0740	Type F Temp Barrier	250	LF	$19.50	$4,875.00
0690	Chanalizers (Extra)	50	EA	$22.00	$1,100.00
0920	4" White Waterborne Paint	1200	LF	$0.20	$240.00
0930	4" Yellow Waterborne Paint	1200	LF	$0.20	$240.00
0960	Stripe Removal (ext stripes)	2000	LF	$0.30	$600.00
	Flagging - 2 people 1.5 days	30	HR	$42.91	$1,287.30
					$26,155.19

Stage 2

0130	Linear Grading Class 2	2.5	STA	$750.00	$1,875.00
0180	4" Type 1 Aggr Base	273	SY	$6.15	$1,678.95
0220	Bit Base PG64-22	51	TN	$85.00	$4,335.00
0540	Impact Atten (9 barrel)	1	EA	$3,500.00	$3,500.00
0740	Type F Temp Barrier	450	LF	$19.50	$8,775.00
0830	4" White Marking Tape	600	LF	$1.10	$660.00
0840	4" Yellow Marking Tape	600	LF	$1.10	$660.00
0920	4" White Waterborne Paint	600	LF	$0.20	$120.00
0930	4" Yellow Waterborne Paint	600	LF	$0.20	$120.00

0960	Stripe Removal	1200	LF	$0.30	$360.00
	Temp Shoring Wall	1	LS	$25,043.60	$25,043.60
	Flagging - 2 people 1.5 days	30	HR	$42.91	$1,287.30
					$26,690.90

Stage 3					
0220	Bit Base PG64-22	45	TN	$85.00	$3,825.00
0650	Construction Signs	96	SF	$8.00	$768.00
0540	Impact Atten (9 barrel) Relocate	1	EA	$1,000.00	$1,000.00
0750	Relocate Temp Barrier	250	LF	$10.00	$2,500.00
0830	4" White Marking Tape	2550	LF	$1.10	$2,805.00
0840	4" Yellow Marking Tape	4100	LF	$1.10	$4,510.00
0920	4" White Waterborne Paint	1600	LF	$0.20	$320.00
0930	4" Yellow Waterborne Paint	0	LF	$0.20	$0.00
0960	Stripe Removal	6650	LF	$0.30	$1,995.00
	Flagging - 2 people 1.5 days	30	HR	$42.91	$1,287.30
					$19,010.30

Total Cost of Rte KK VE Proposal	**$93,580.34**

Savings Obtained by VE Proposal	**$19,486.18**

157+50-154+00, new price for Class 2 to account for low production and possilbe haul in/out
Quantity is amount plus 40% for low production on varible width taper
0-11' from 154+00 to 155+00, 11-15' from 155+00-156+00, 0-11' from 156+00-157+50

For extra lane widenings
Striping from 152+00-158+00 for lane shifts
Striping from 152+00-158+00 for lane shifts

161+00-158+50, new price for Class 2 for low production and haul in/out on material
7' wide to cover under barrier + 40% for extremely low production on wideningss
5' Widening 158+50-161+00, 3 driving & 2' out to barrier 50.2 TN

200' on bank stablization, 250 on shoring

Tape on new pvmt or existing pvmt that remains
Paint on old to road to be removed

Removal of Tape from 161+00 to Existing US 54

50' long, 24 ft wide, 6" deep = 44.4 TN for wedging into Existing KK

Plugged #
Relocate Barrier from bottom of Temp Shoring wall to Top
150' for tie W of 161+00, 1200' from161+00-150+00 extra for curve, 1200' for late Stg 3 145+00-153+00
300' for tie W of 161+00, 2200' from 161+00-150+00 DY, 1600' from 145+00-153+00 DY late Stg 3
1100' for WB Edge Line, 500' for EB edge Line

estimate 3 signs extra per side at 16 SF each = 96 sf

EMERY SAPP & SONS, INC.

140 Walnut St.
Kansas City, MO 64106
O: 816.221.3500
F: 816.421.9333

2602 N. Stadium Blvd.
Columbia, MO 65202
O: 573.445.8331
F: 573.445.0266

5350 E. State Hwy. AA
Springfield, MO 65803
O: 417.833.9915
F: 417.833.9981

August 19, 2010

Mr. Mike O'Malley
Missouri Dept. of Transportation
93 Morgan Street
Camdenton, MO 65020

RE: Value Engineering Proposal #1- Relocation of Rte KK Bypass
Route 54, Camden County
Job No. J5P0347G

Mr. O'Malley:

The following Value Engineering Proposal regards relocation of the Rte KK bypass from its' current location on the north side of Existing KK to the south side of the highway. Relocating the bypass to the south side of Existing KK will produce numerous advantages. An estimated cost savings of approximately $19,486.14 will occur by using the Value Engineering proposal.

Under the current design a bypass is to be constructed in Stage 1 north of both the existing and newly aligned Rte KK. The bypass would be 22 ft in width and provide traffic access around the work zone while the new bridge and grading are being completed. Once traffic is switched onto the bypass, Stage 2 will begin. Stage 2 consists of constructing the entire roadway west of the bridge up to Sta 147+00. East of the bridge the roadway would be constructed up to approx Sta. 156+00. From here the EB Lanes would be graded to design profile all the way to the tie-in with Existing Rte KK at Sta 161+00. Once the New Rte KK had been connected on both ends Stage 3 would begin. In Stage 3 traffic would be switched onto the new EB Lanes of Rte KK running head to head from Sta 161+00 to approx Sta 156+00. From Sta 156+00 to Sta 147+00 traffic would occupy its normal driving lanes. The remaining portion of the WB lanes would be constructed from Sta 156+00 to Sta 161+00 in Stage 3, and traffic would be provided access to the finished roadway once completed.

There are a few significant problems surrounding the construction of the Rte KK bypass as designed in the plans. The designed profile for the new US 54 drains the entire road bed north from Sta 329+00 to the bridge at Sta 322+43. The location of the Rte KK Bypass as designed eliminates the possibility of excavating a drainage system away from the bridge that would prevent ponding under the structure during Stage 2. The inability to drain will result in ponding up to depths of 10 ft deep under the bridge if not pumped out regularly by the contractor. A substantial amount of excavation will be required from the Rte KK Bypass south. With the majority of this material being waste, a long term truck crossing will be required to get

material across the bypass into the waste area. This will result in continuous traffic disruption from flagging operations throughout the excavation process. Road plates will more than likely be required at the crossings creating further inconvenience to motorist.

Emery Sapp & Sons Inc proposes to relocate the Rte KK bypass to the south edge of Existing Rte KK. By moving the bypass to the south both the drainage and truck crossing issues would be resolved. The new alignment will allow traffic to remain on Existing Rte KK further into the construction process, resulting in fewer days requiring bypass traffic. Moving the Bypass would also produce a cost savings of an estimated $19,486.14. There are a few variables that may alter the cost savings (top of rock elevations and existing subgrade stability), so an exact number will not be apparent until further into the construction process.

Under the proposal a four stage process will be required to route traffic around the active work zones. In Stage 1 traffic would be shifted south onto a lane widening on Existing Rte KK from roughly Sta 157+50 to Sta 153+00. This would allow adequate room for excavation required to access the substructure of bridge A7697 to begin. Construction of Bridge A7697 and sections of the New Rte KK would be performed in Stage 1. In Stage 2 traffic would be shifted south on Existing KK from approx Sta 156+00 to Sta 161+00 to allow the WBL's of New Rte KK to be graded and paved from the bridge to Sta 161+00. Stage 3 will consist of making a temporary wedge from New Rte KK to Existing Rte KK at approx Sta 150+60. Traffic will then be placed on the New Rte KK to allow construction of the EB lanes across Existing KK to be built from Sta 149+75 to Sta 150+50. The Rte KK connector from Sta 130+18 to Sta 133+96 and the WB lanes of Rte KK from Sta 149+75 to Sta 150+50 would be paved in the latter half of Stage 3. Stage 4 would consist of building the EB lanes of Rte KK from approx Sta 156+00 to Sta 161+00. Final striping will be performed at the end of Stage 4, and Rte KK will be fully opened to traffic.

The following paragraphs go over each stage in detail providing further explanation of the sequences.

Stage 1

ESS will begin excavating on the US 54 roadway from Existing Rte KK north. Type F Barrier will be placed along the shoulder of Existing Rte KK to protect motorist from the shoulder drop off. Excavation on US 54 must continue in Stage 1 until adequate space is acquired to allow construction of bridge A7697's substructure. ESS intends to excavate US 54 to grade up to Sta 323+00, from here a slope no steeper than 1.5:1 will be cut up to the point at which it daylights against Existing Rte KK. Where rock is encountered vertical faces will be used to reduce slope distance. The depth at which rock is encountered will determine to what extent Existing Rte KK traffic must be shifted southward. Based off of the plans rock should be encountered around EL 850.0 plus or minus. From this information it is estimated a lane widening will be needed from approx Sta 157+50 to Sta 154+00 ranging from 0 to 15 feet in width. The widest point is expected from Sta 155+00 to Sta 156+00 with an average width of roughly 13 feet. Temporary 4" Waterborne paint will be used to remark the new lane locations on the widening. Where widening is required to maintain a 22 ft roadway; grading, 4" Type 1 Base, and 6.5" Bit Base will be added along the south edge of Existing Rte KK.

During Stage 1 construction of Rte KK Ramps 1&2 will be performed. The majority of Bridge A7697 will be constructed in Stage 1. Rte KK from Sta 147+00 to the Bridge will be constructed except for the section occupied by Existing Rte KK. Rte KK from the bridge east will be constructed to the furthest extent possible without hindering traffic on Existing KK. Once Rte KK and Ramps 1&2 have been graded to the furthest extents possible in Stage 1, Stage 2 will be put into motion.

Cost associated with Stage 1 include grading for widening, laying base, paving widening, installing temp barrier, temp striping, and stripe removal. Combine these cost produce an estimated cost of $26,155.19 to complete this stage. A breakdown of estimated cost can be viewed on the attached spreadsheet.

Stage 2

ESS will shift traffic traveling on Existing Rte KK into the WB lanes from Sta 158+00 to Sta 161+00. This will provide sufficient room to widen approx seven feet on the south side of Existing KK from Sta 158+50 to Sta 161+00. The embankment along the existing south edge from Sta 159+00 to Sta 161+00 will have to be dug off nearly vertical in order to provide enough room for the widening. Type F Barrier will be placed along the side of the near vertical face to act as temp retain wall for any soil or rock that may slide. The vertical cut itself will be relatively shallow and will be sloped back where possible.

Once the widening is complete traffic will then be switched from the WB lanes over to the EB lanes of Existing Rte KK. At this point construction of a wire basket temp shoring wall will begin from approximately Sta 158+00 to Sta 159+75. The temp shoring will allow fills to be made on Rte KK's WB lanes without affecting traffic. Rte KK's WB lanes will then be completed from CL to the Left EOP from the bridge to the tie-in at Sta 161+00. Type F Barrier will be placed along the top of the temp shoring wall to protect motorists. ESS would like to propose grinding a butt joint at the tie-in Sta 161+00 and overlaying from approx Sta 160+00 east where grades are shallow verses removing and replacing the entire section. This will help prevent an edge drop off along Existing Rte KK EB Lanes carrying the traffic flow.

By the end of Stage 2 Rte KK will be completed from Sta 147+00 to approx Sta 149+75 where it intersects Existing Rte KK, Sta 150+50 to the bridge, and the WB lanes only from the bridge to Sta 161+00.

Cost associated with Stage 2 include construction of Temp Shoring Wall, Type F Barrier Wall, grading for Existing KK widening, 6.5" Asphalt paving for widening, and temp striping. An estimated cost of $48,414.85 will be required to complete this stage. A breakdown of estimated cost can be viewed on the attached spreadsheet.

Stage 3

In Stage 3 traffic on Existing Rte KK would be temporary flagged so the asphalt wedging could be preformed to connect Rte KK at approx Sta 150+50 into Existing Rte KK. Prior to this stage Rte KK would be completed from Sta 147+00 to Sta 149+75 and from Sta 150+50 to Sta 161+00. A striping crew would switch traffic over from Existing Rte KK to new Rte KK at Sta

161+00. Traffic would be held in the WB lanes only on Rte KK while the connection of the EB lanes was being made. Traffic would be able to travel from Sta 161+00 to Sta 150+50 on new Rte KK's WB lanes, where it would then make a sharp turn north back onto Existing Rte KK.

Once traffic was switch off of Existing Rte KK from Sta 161+00 to the west, and Existing KK would be demolished. The EB lanes of Rte KK would be connected from Sta 149+75 to Sta 150+50. The paving crew would then be moved up to complete the Rte KK connector from Sta 130+18 to Sta 133+96. Once the connector was completed traffic would be switched onto new Rte KK outer road, traveling through the roundabout, and cross over the newly paved EB lanes of Rte KK to get access back to Existing US 54.

After Rte KK traffic was switched onto the EB lanes of Rte KK from the roundabout to Sta 150+50, the WB lanes would be constructed on Rte KK from Sta 149+75 to Sta 150+50. Upon completion of the WB lanes traffic would be returned to its' designed driving lanes. Rte KK will then be complete from Sta 130+18 to approx Sta 155+50, with only Stage 4 construction of the EB lanes from approx Sta 155+50 to Sta 161+00 remaining.

Cost associated with Stage 3 include construction of Type F Barrier Wall, Asphalt wedging, construction signs, temp striping, and stripe removal. An estimated cost of $19,010.30 will be required to complete this stage. A breakdown of estimated cost can be viewed on the attached spreadsheet.

Stage 4

In Stage 4 traffic will be occupying the WB lanes of Rte KK from Sta 161+00 to the bridge. This will allow the EB lanes to be constructed from approx 155+50 to Sta 161+00 completing Rte KK. Ramps 3&4 would be tied into Rte KK during this stage as well. At the end of Stage 4 final striping would be preformed, and EB traffic would be returned to the EB lanes of Rte KK completing the new alignment.

In conclusion, the Value Engineering Proposal for relocation of the Rte KK Bypass produces a possible cost saving of $19,486.14 while helping prevent constructability issues unforeseen in the original design. The VE Proposal will help further expedite the project as well, helping reduce the overall inconvenience inflicted on the traveling public. The VE Proposal will also allow ESS to continue working in the event the joining contractor falls behind on the outer road and roundabout required to put traffic on the Bypass in the original Stage 1. The fire station, RP Lumber, and Carpet 1 will have access through Existing Rte KK the entire time the bridge and majority of Rte KK is being constructed using the VE.

VALUE ENGINEERING CHECK SHEET

TYPE OF WORK

(Check one that applies)

- ☐ Bridge/Structure/Footings
- ☐ Drainage Structures (RCP, RCB, CMP's, ect.)
- ☑ TCP/MOT
- ☑ Paving (PCCP, ect.)
- ☑ Grading/MSE Walls
- ☐ Signal/Lighting/ITS
- ☐ Misc. _____

SUMMARY OF PROPOSAL

(If needed, condense summary to a couple of lines)

Changing location of temp by-pass to eliminate re-work and speed construction to lower number of days by-pass will be needed

SCANNING OF DOCUMENT

If the proposal is large, please mark or make note, which pages need to be scanned into the database. If there are special instructions, make note of them here.